

REMARKS

Claims 36, 44, 55, 59 and 60 have been amended. Claims 29-32, 34-39, 41, 44-47, 49 and 51-64 are currently pending in this application. Applicant reserves the right to pursue the original and other claims in this and other applications. Applicant respectfully requests reconsideration in light of the above amendments and the following remarks.

Applicants gratefully acknowledge the allowance of claims 29-32, 34 and 35.

Claims 36-39, 41, 44-47, 49 and 51-64 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Jeng et al. (U.S. Patent No. 6,184,081) ("Jeng") in view of Aoki et al. (U.S. Patent No. 6,033,953) ("Aoki"). This rejection is respectfully traversed and reconsideration is respectfully requested.

Claim 36 recites a memory cell comprising a "transistor including a gate fabricated on a semiconductor substrate and including a source/drain region in said semiconductor substrate disposed adjacent to said gate," an "insulating layer provided over said substrate" and a "container capacitor." The capacitor includes a "lower electrode, a dielectric layer over said lower electrode, and an upper electrode over said dielectric layer, said upper electrode comprising doped polysilicon, and said lower electrode having a surface aligned over said source/drain region." The "lower electrode comprises an electropolished patterned metal layer which is situated fully within said insulating layer [and] ... has a thickness of about 50 to about 300 Angstroms." Further, the "dielectric layer is in contact with said insulating layer."

Claim 44 recites a processor-based system including a "processor" and an "integrated circuit coupled to said processor." Further, "at least one of said integrated circuit and said processor compris[e] a container capacitor provided within an insulating layer, said container capacitor including a lower electrode and an upper electrode, said lower electrode comprising an electropolished patterned metal layer having a thickness of approximately 50 to 300 Angstroms, wherein a top surface of said electropolished patterned metal layer is at the same level with a top

surface of said insulating layer such that said lower electrode does not extend above the top surface of said insulating layer.”

Claim 55 recites a container capacitor including a “lower electrode provided fully within a first insulating layer, said lower electrode comprising an electropolished patterned metal layer having a bottom wall and vertical sidewalls extending rectangularly upwardly therefrom,” a “second insulating layer provided over said electropolished patterned metal layer and in contact with said first insulating layer” and an “upper electrode provided over said second insulating layer.”

Claim 59 recites a container capacitor including an “insulating layer provided over a substrate, said insulating layer containing an opening,” a “tantalum nitride barrier conductive layer provided at a bottom of said opening,” a “lower electrode provided over said tantalum nitride barrier conductive layer, said lower electrode comprising an electropolished patterned metal layer having a bottom and vertical sidewalls extending upwardly from said bottom such that said lower electrode is situated fully within said insulating layer, said lower electrode having a thickness of approximately 100 Angstroms,” a “dielectric material provided over said electropolished patterned metal layer and in contact with said insulating layer” and an “upper electrode comprising doped polysilicon provided over said dielectric material.” The “lower electrode, said dielectric material and said upper electrode form said container capacitor.”

Claim 60 recites a container capacitor structure including an “insulating layer provided over a substrate,” a “plurality of rectangular openings provided in said insulating layer,” a “plurality of lower capacitor electrodes provided along the bottom and sidewalls of respective ones of said rectangular openings, said lower electrodes being formed as discrete electropolished metal layers such that said lower electrodes do not extend above an upper surface of said insulating layer” and a “dielectric layer associated with each of said discrete lower electrodes, said dielectric layer being in contact with said insulating layer.”

The claimed invention relates to an electropolished patterned metal layer formed as a lower electrode of a capacitor, which may be part of a semiconductor device. Jeng, on the other

hand, relates to a method of forming an upper plate of a capacitor “simultaneously with the opening of bit line, and substrate, contact hole openings, using the same photolithographic mask and dry etching procedures.” Jeng, col. 1, lines 62-65. Aoki relates to a method of forming a dielectric capacitor with a reduced leakage current. Aoki, Abstract.

Applicants respectfully submit that the Office Action fails to set forth a *prima facie* case of obviousness. See M.P.E.P. § 2142. “To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art.” M.P.E.P. § 2143.03. Applicants respectfully submit that the combination of Jeng and Aoki does not disclose, teach or suggest all the limitations of the claimed invention. Specifically, the cited combination does not disclose a lower electrode comprising an electropolished patterned metal layer which is situated “fully within” an insulating layer as recited in claims 36, 55 and 59. The cited combination also does not disclose a lower electrode that does not extend above the top (upper) surface of an insulating layer, as required by claims 44 and 60.

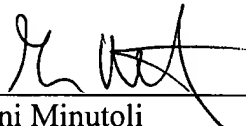
The capacitor structure disclosed in Jeng does not disclose, teach or suggest the claimed structure. Instead, Jeng’s lower electrode 20 extends well above an upper surface of Jeng’s insulating layer 22. See Jeng, FIG. 6. As such, Jeng’s lower electrode also cannot be located “fully within” the insulating layer. Aoki is relied upon as disclosing the use of platinum as a material for forming the lower electrode (Office Action, page 3), but does not remedy the deficiencies of Jeng.

Accordingly, claims 36, 44, 55, 59 and 60 are allowable over the cited combination. Claims 37-39 and 41 depend from claim 36 and are allowable along with claim 36. Claims 45-47, 49 and 51-54 depend from claim 44 and are allowable along with claim 44. Claims 56-58 depend from claim 55 and are allowable along with claim 55. Claims 61-64 depend from claim 60 and are allowable along with claim 60. Applicant respectfully requests that the rejection of claims 36-39, 41, 44-47, 49 and 51-64 be withdrawn and the claims allowed.

In view of the above, Applicant believes the pending application is in condition for allowance.

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Respectfully submitted,

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